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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,521	03/19/2004	Kazumasa Hasegawa	9319T-124DVB	9780
27572	7590	05/04/2006	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C.			TRAN, HENRY N	
P.O. BOX 828			ART UNIT	
BLOOMFIELD HILLS, MI 48303			PAPER NUMBER	
			2629	

DATE MAILED: 05/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/805,521

Applicant(s)

HASEGAWA ET AL.

Examiner

Henry N. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/494,051.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                                                       |                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                                           | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3-19-04, 7-14-04, 9-20-05, 3-16-06</u> | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

This Application has been examined. The Preliminary Amendment received 3/19/04 has been entered. The original claims 26-53 are pending. The examination results are as follows.

### *Information Disclosure Statement*

1. The examiner has considered the documents listed in forms PTO-1449 submitted with the Information Disclosure Statements (IDSs) received 3/16/06, 9/20/05, 9/14/05 and 3/19/04 (see the attached forms PTO-1449).

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 26-53 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 6 of U.S. Patent No. 6,842,166. Although the conflicting claims are not identical, they are not patentably distinct from each other because the

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claim 6 of the U.S. patent and the claims 26-53 of the present application are directed to the same invention or are obvious variants. For example, the reference claim 6 and the application claim 26 are both directed to a thin film piezoelectric transducer, wherein:

The reference claim 6 requires:

a supporting base wherein a cavity is formed;  
a diaphragm comprised of a zirconia film disposed on said supporting base;  
a first electrode layer disposed on a portion of said diaphragm, the first electrode layer including layers of platinum and titanium;  
a piezoelectric film layer disposed on a portion of said first electrode layer and a portion of said diaphragm, the piezoelectric film layer containing lead zirconate titanate;  
a second electrode layer disposed on a portion of said piezoelectric film layer, the second electrode layer including layers of platinum and titanium; and  
a third electrode layer disposed on a portion of said piezoelectric film layer and a portion of said diaphragm, wherein said second electrode and said third electrode layer are disposed as a pair with a space therebetween on the piezoelectric film layer located above said cavity;  
Said third electrode layer is formed to span an end surface and an upper layer surface of said piezoelectric film layer; and wherein upon application of an alternating voltage between the first electrode layer and the second electrode layer, an amplified output from between the first electrode layer and third electrode layer.

The application claim 26 requires:

a supporting base having a cavity formed therein;  
a diaphragm disposed on said supporting base;  
a piezoelectric film layer located above said cavity, said piezoelectric film layer having:  
an upper surface which is not adjacent to said diaphragm;  
and an end surface adjacent to said upper layer;  
a first electrode layer and a second electrode layer disposed on said diaphragm;  
a third electrode layer disposed on said piezoelectric film layer;  
wherein said second electrode layer and said third electrode layer are spaced apart along said upper surface of said piezoelectric film layer;  
said first electrode layer, said second electrode layer, and said third electrode layer independently contact said piezoelectric film layer; and  
at least a part of one of said three electrode layers is disposed between said diaphragm and said piezoelectric film layer.

The claims have a different scope; wherein, the scope of the present claim is broader than that of the patented claim; moreover, the patented claim requires that the first electrode layer, the second electrode layer, and the third electrode layer are disposed on a portion of a diaphragm, or a portion of a piezoelectric film layer, while the present claim requires that the first electrode layer, the second electrode layer, and the third electrode layer are disposed on a diaphragm, or a piezoelectric film layer, which are considered as an obvious variation of that of the patented claim. Clearly, the difference in scope is minor and is an obvious variation; the nonstatutory obviousness-type double patenting rejection is therefore appropriate.

Similar comparisons for the other application claims 27-53 with the reference claim 6, the differences in scope are minor and are obvious variations; and the nonstatutory obviousness-type double patenting rejection is appropriate.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 26-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al (U.S. Patent No. 5,376,857, hereinafter referred to as "Takeuchi").

6. Regarding claim 26, Takeuchi, Figs. 3, 4 and 7A, teaches a thin film piezoelectric transducer (1) comprising: a supporting base (2) having a cavity (2c) formed therein; a diaphragm (2a) disposed on said supporting base; a piezoelectric film layer (5) located above said cavity, said piezoelectric film layer having: an upper surface which is not adjacent to said diaphragm, and an end surface adjacent to said upper surface; a first electrode layer (10) and a second electrode layer (4) disposed on said diaphragm; a third electrode layer (6) disposed on said piezoelectric film layer; said first electrode layer (10), said second electrode layer (4), and said third electrode layer (6) independently contact said piezoelectric film layer (5); and at least part of one of said three electrode layers, e.g., said first electrode layer (10), is disposed between said diaphragm (2) and said piezoelectric film layer (5); see col. 6, lines 2-24; col. 7, lines 42-65. Although, Takeuchi does not teach expressly that the second electrode layer (4) and said third electrode layer (6) are spaced apart along the upper surface of said piezoelectric film layer.

However, Takeuchi does teaches that the arrangement of the electrode layers (4), (6) and (10) may be modified to cover different regions of the piezoelectric layer (5); see Figs. 7 and 8; col. 8, lines 5-9. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the arrangement of the second electrode layer (4) and said third electrode layer (6) for having them spaced apart along the upper surface of said piezoelectric film layer because this would provide an improved piezoelectric device capable of producing excellent conversion efficiency at a given operational voltage; see col. 13, lines 62-66.

7. Regarding claim 27, Takeuchi further teaches that the thin film piezoelectric transducer, having a cavity (2c) formed by a single crystal silicon substrate (2), see Fig. 3.

8. Regarding claim 28, Takeuchi further teaches that the diaphragm of the thin film piezoelectric transducer is formed of a zirconia thin film; col. 12, line 67 to col. 13, line 5.

9. Regarding claim 29, Takeuchi further teaches the first, second, and third electrode layers of thin film piezoelectric transducer are formed of a multilayered structure of platinum; see col. 11, lines 6-20.

10. Regarding claim 30, Takeuchi further teaches that the piezoelectric film layer (5) of the thin film piezoelectric transducer is formed of a lead-titanate-zirconate piezoelectric material; see col. 11, lines 50-55.

11. Regarding claim 31, Takeuchi further teaches that an arbitrary voltage waveform is applied between the upper and lower electrodes for providing a force for displacing the piezoelectric transducer; see col. 13, lines 20-30 and lines 62-65. Clearly, with the use of three separate electrode layers 4, 6, and 10; when an arbitrary voltage waveform is applied between

the upper and lower electrodes, e.g., electrodes layers 6 and 10, an amplifier voltage is output between the two electrode layer 4 and 6.

12. Regarding claims 32-38, which comprise similar claimed elements and limitations of claims 26-31, and further comprises that: the second electrode layer (4) and third electrode layer (6) are disposed as a pair with a space therebetween; and the third electrode layer is formed to span an end surface and upper layer surface of said piezoelectric film layer. Takeuchi further teaches that the second electrode layer (4) and third electrode layer (6) are disposed as a pair with a space therebetween; and the third electrode layer (6) is formed to span an end surface and upper layer surface of the piezoelectric film layer (5), see Fig. 4. Claims 32-38 are therefore rejected on the same basis set forth in claims 26-31, and by the reasons noted above.

13. Regarding claims 39-46, which comprise claimed elements and limitations of claims 32-38, and are therefore rejected on the same reasons set forth in claims 32-38 discussed above.

14. Regarding claims 47-53, which comprise similar claimed elements and limitations of claims 26-31, and further comprises that: the second and third electrode layers being positioned on one side of said piezoelectric film layer in a width direction of said cavity; and the third electrode layer is formed to span an end surface and upper layer surface of the piezoelectric film layer. Takeuchi further teaches that the second electrode layer (4) and third electrode layer (6) are disposed on one side of said piezoelectric film layer in a width direction of said cavity; and the third electrode layer (6) is formed to span an end surface and upper layer surface of the

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piezoelectric film layer (5), see Fig. 4. Claims 47-53 are therefore rejected on the same basis set forth in claims 26-31, and by the reasons noted above.

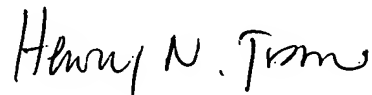
***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. They are U.S. Patents Nos.: 6,088,893 issued to Takeuchi et al and 6,013,970 issued to Nishiwaki et al, that teaches piezoelectric thin film devices.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Henry N. Tran whose telephone number is 571-272-7760. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, RICHARD A. HJERPE can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry N Tran  
Primary Examiner  
Art Unit 2629

HT